DESCRIPTIONS OF GALL MIDGES (DIPTERA).

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Below we give descriptions of several species of gall midges, all reared, one striking form representing a new genus and species, while the obtaining of adults enables us to make a positive generic reference for a gall which had been known for several years.

Winnertzia aceris new species.

The white larvæ of this midge occurred singly or in small groups under thin decaying bark of a sugar maple at Nassau, N. Y., March 12, 1913, and presented a somewhat superficial resemblance to a sparse *Miastor* colony, except that no mother larvæ were to be seen. The adults, closely allied to both *W. calcicquina* Felt and *W. pectinata* Felt, appeared in April. The male of the former has heavy circumfili extending to the basal fourth of the enlargement, while in this new species the basal portion of the circumfili reaches only to the distal third of the enlargement as in *W. pectinata*. The chitinization of these structures is much weaker than in the last-named species, the basal enlargement is more globose than cylindric, and there are also differences in the genitalia. The stem of the penultimate antennal segment in *W. calcicquina* is greatly reduced, making the 14th segment nearly sessile, a condition not obtaining in this species.

Larva.—Length 3 to 5 mm., white, the head slender, tapering, light brown. Antennæ large, biarticulate, the distal segment somewhat expanded; breastbone slender, dark brown, the anterior extremity paler, broadly rounded and somewhat expanded. This structure appears to be obsolescent in some specimens. Body segments moderately distinct, the skin finely lined longitudinally and with transverse bands of spines similar to those of *Miastor* at the incisures; terminal segment with submedian lobes, each with a slender, curved, chitinous process apically.

Male.—Length 2 mm. Antennæ nearly as long as the body, sparsely haired, dark brown; 14 segments, the fifth with a stem ¾ the length of the subglobose basal enlargement, which latter has a length ½ greater than its diameter; circumfili extending only to the distal third of the enlargement; penultimate segment with a well developed stem; terminal segment produced, with a length nearly three times the diameter, tapering to a narrowly rounded

apex. Palpi; first segment subquadrate, second with a length fully three times the diameter, the third a little longer, more slender, the fourth nearly twice the length of the third. Mesonotum yellowish brown, sparsely haired. Scutellum, postscutellum and abdomen a nearly uniform fuscous yellowish, the halteres somewhat lighter. Coxæ and femora yellowish white, tibiæ yellowish, tarsi fuscous yellowish, darker apically; claws moderately slender, unidentate, the pulvilli short, with a length over twice the diameter and apically a pectinate spur; dorsal plate long, triangularly emarginate, the lobes broad, obliquely truncate and sparsely setose.

Female.—Length 2 mm. Antennæ extending to the second abdominal segment, sparsely haired, fuscous yellowish; 14 subsessile segments, the fifth with a length 2½ times the diameter, the circumfili extending to the basal fourth; terminal segment reduced, subconical. Palpi; first segment with a length three times its width, second a little longer, broader, the third ½ longer than the second, the fourth nearly twice the length of the third, dilated apically. Face and mouth-parts fuscous yellowish. Mesonotum fuscous yellowish. Scutellum yellowish, postscutellum fuscous yellowish. Abdomen mostly light fuscous yellowish, the ovipositor apically fuscous, its lobes yellowish. Halteres, coxæ and femora basally yellowish transparent. Ovipositor nearly as long as the body, the lobes triarticulate. The basal segment irregularly quadrate, the second suboval and nearly fused with the third, which latter tapers to a narrowly rounded apex. Type Cecid *a*2381.

Camptomyia tsugæ new species.

This large midge was reared in March from yellowish orange larvæ found under the bark of hemlock, *Tsuga canadensis,* bored by the spotted hemlock borer, *Melanophila fulvoguttata* Harr., and forwarded to this office by Herman W. Merkel, of New York. The female, when at rest, carries the antennæ slightly curved and nearly at right angles to the support, the slender ovipositor being recurved over the back. A gravid female contained about 40 eggs, each approximately .12 mm. long, narrowly lanceolate and so arranged within the body as to give, by transmitted light, a "herring-bone" effect.

Larva.—Length about 6 mm., yellowish orange, with a slender, distinct breastbone. Head stout, the margins rather heavily chitinized, the antennæ biarticulate, stout, moderately long. Skin smooth, the posterior extremity bilobed, each lobe with a dorsal, slightly recurved, chitinous process.

Male.—Length 3.5 mm. Antennæ ½ longer than the body, thickly haired, fuscous yellowish, the stems whitish transparent; 27 segments, the fifth with a stem ¼ longer than the cylindric basal enlargement, which latter has a length ½ greater than its diameter; distal whorl of setæ long, stout. Penultimate segment reduced, subsessile, the terminal segment narrowly oval. Palpi: first segment subrectangular, the second a little longer, stouter, the third ¾

longer than the second, and the fourth a little longer and more slender than the third. Mesonotum yellowish brown. Scutellum and postscutellum yellowish orange. Abdomen sparsely haired, reddish orange, the distal segments and genitalia fuscous yellowish. Halteres yellowish orange, reddish apically. Coxæ and femora basally pale straw, the distal portion of femora, tibiæ and basal tarsal segments fuscous straw, the three distal tarsal segments mostly yellowish straw. Claws unidentate, the pulvilli about as long as the claws. Genitalia: basal clasp segment long, subtriangular; terminal clasp segment long, subfusiform; dorsal plate short, broad, slightly and roundly emarginate, the lobes short, broadly rounded; ventral plate long, divided, the lobes narrowly rounded. Harpes slender, narrowly rounded apically, setose.

Female.—Length 3.5 mm. Antennæ nearly as long as the body, sparsely haired, fuscous yellowish; 27 segments, the fifth with a stem 1.4 the length of the cylindric basal enlargement, which latter has a length about twice its diameter and is sparsely clothed with stout setæ; terminal segment somewhat produced, conical and partly fused with the penultimate. Palpi: first segment short, second subquadrate, with a length thrice its diameter, the third twice the length of the second, the fourth a little shorter and more slender than the third. Mesonotum fuscous yellowish, sparsely haired, the submedian lines yellowish. Scutellum reddish orange, postscutellum fuscous yellowish. Abdomen reddish orange, the stout ovipositor fuscous yellowish, about half the length of the abdomen and recurved dorsally; terminal lobes triarticulate, the basal irregular, the second subquadrate, the apical narrowly oval, all sparsely setose. Claws unidentate, the pulvilli as long as the claws. Type Cecid *a2375*.

Dasyneura cercocarpi new species.

The midges described below were reared April 21, 1913, from an imbricated bud gall on *Cercocarpus parvifolius,* collected the preceding October by Professor E. Bethel at Golden, Col. The female of this species runs in our key next *D. flavoabdominalis* Felt, while the male approaches in characters *D. aromaticæ* Felt.

Gall.—8 to 10 mm. in diameter, elongate, oval, white or slightly brownish and thickly tomentose. This gall is an arrested, imbricated bud containing several larvæ.

Larva.—Length 2 mm., reddish orange. Head moderately large. Antennæ tapering, with a length fully three times the diameter; breastbone well chitinized, bidentate, the teeth triangular. Skin coarsely shagreened, posterior extremity broadly rounded.

Male.—Length 1.5 mm. Antennæ nearly as long as the body, sparsely haired, dark brown; 16 segments, the fifth with a stem as long as the cylindric basal enlargement, which latter has a length ½ greater than its diameter; terminal segment reduced, narrowly oval. Palpi: first segment irregular, the second with a length nearly three times its diameter, the third ½ longer and more slender, the fourth ¼ longer than the third. Mesonotum shining brown-

ish black, the submedian lines sparsely haired. Scutellum reddish brown, postscutellum darker. Abdomen sparsely haired, yellowish red, the dorsal sclerites dark reddish brown. Genitalia fuscous. Wings hyaline, costa dark brown. Halteres yellowish basally, reddish apically. Coxæ, femora and tibiæ fuscous yellowish, the tarsi somewhat darker; claws slender, unidentate, the pulvilli as long as the claws. Genitalia: basal clasp segment long, slender; terminal clasp segment short, stout; dorsal plate long, broad, deeply and triangularly emarginate, the lobes divergent, tapering, narrowly rounded; ventral plate rather long, moderately broad, deeply and roundly emarginate, the lobes narrowly triangular, obtuse and sparsely setose apically. Harpes thickly setose and minutely dentate apically.

Female.—Length 1.75 mm. Antennæ extending to the third abdominal segment, sparsely haired, dark brown; 15 or 16 sessile segments, the fifth with a length ¾ greater than its diameter, the terminal segment either reduced and conical or compound and composed of two closely fused and greatly reduced segments. Mesonotum shining black. Scutellum and postscutellum fuscous orange. Abdomen sparsely haired, mostly deep red, the dorsal sclerites slightly fuscous. Halteres yellowish, the fuscous yellowish, ovipositor as long as the abdomen, the terminal lobes slender, with a length about four times the width, sparsely setose. Otherwise as in the male. Type Cecid *a*2359.

Dasyneura parthenocissi Stebb.

1906. Jarvis, T. W., Ent. Soc. Ont., 32d Rept., pp. 68–69, Pl. *D*, fig. 7 (without name).

1910. Stebbins, F. A., Springf. Mus. Nat. Hist. Bull. 2, p. 44 (*Cecidomyia?*).

The above name was proposed on the basis of the earlier description by Jarvis, and while there may be some question as to the validity of this earlier characterization, the following descriptions of the various stages will establish the specific name.

The midges described below were reared from a tumid vein swelling very abundant on Virginia creeper, *Psedera quinquefolia,* in early June at Nassau, N. Y., and remarkable because of the pronounced ridges or carinæ generally present. These galls are presumably identical with a more common type of smooth vein swelling known to be widely distributed in New York state and which has been recorded from Guelph, Canada, by T. D. Jarvis. The white or reddish larvæ producing the gall vary in numbers somewhat in proportion to the size of the deformity. They desert the swellings early and evidently hibernate at the surface of the soil in earth, or débris-walled cocoons and fly presumably some time in the spring.

Gall.—Length about 1.5 cm., diameter about 1 cm. The upper surface of the leaf, usually along the midrib, is slightly contracted, while on the lower side there is a turgid lateral swelling usually originating from the midvein and generally (in specimens collected in 1912) showing distinct ridges or carinæ. In some instances series of galls attain a length of 6 or 7 cm. and in a number of cases all of the leaflets of one leaf were infested. In a few instances the attack developed so early as to practically prevent the formation of foliage, though in most cases the leaves attained nearly full size.

Larva.—Length 3.5 mm., white or reddish orange, moderately stout. Head broad, the length being about ¾ the width, the lateral angles produced posteriorly as long, tapering, chitinous processes. Antennæ relatively long and tapering. Skin moderately smooth, subpapillate on the posterior segments, the segmentation moderately distinct, breastbone bidentate, the shaft irregularly chitinized and subobsolescent, posterior extremity broadly rounded.

Cocoon.—Length 2 mm., oval and covered with coarse grains of sand.

Exuvium.—Length 2 mm., whitish. Antennal cases extending to the first abdominal segment, the wing cases to the fourth abdominal segment and the leg cases nearly to the extremity of the abdomen. About three fourths of the exuvium protrudes from the cell.

Male.—Length 1 mm. Antennæ nearly as long as the body, thickly haired, dark brown; 16 segments, the fifth with a stem ¾ the length of the basal enlargement, which latter has a length ½ greater than its diameter; penultimate segment with the stem reduced and sometimes partly fused with the narrowly oval, more reduced terminal segment. Palpi: first segment irregularly quadrate, the second ½ longer, the third as long as the second and the fourth ½ longer than the third. Mesonotum dark brown. Scutellum and postscutellum fuscous yellowish. Abdomen reddish brown. Wings with third vein distinctly curved anteriorly. Halteres fuscous yellowish. Coxæ and femora mostly fuscous yellowish. Tibiæ and tarsi dark brown, the pulvilli nearly as long as the claws. Genitalia: dorsal plate deeply and roundly emarginate, the lobes narrowly rounded ventrally; ventral plate deeply and roundly emarginate, the lobes long, fingerlike. Harpes produced, irregularly dentate apically.

Female.—Length 1.25 mm. Antennæ about half the length of the body, sparsely haired, dark brown; 17 sessile segments, the fifth with a length ¼ greater than its diameter, the terminal segment slightly reduced. Palpi nearly as in the male, except that the fourth segment is nearly ¾ longer than the second. Mesonotum fuscous. Abdomen dark reddish brown. Coxæ yellowish orange. Ovipositor about as long as the body, the terminal lobes lanceolate, with a length about three times the diameter. Otherwise as in the male. Type Cecid *a2293*.

ASTRODIPLOSIS new genus.

This member of the trifili is separated from its allies by the uniarticulate palpi, the well-developed circumfili, the normal mesonotum and the peculiar genitalia. Though apparently allied to the Argentine

Cystodiplosis Kieff. & Jörg. by the reduced palpi and the third vein uniting with the margin well beyond the apex, it is easily distinguished therefrom by the wings not being very long, the rudimentary pulvilli and the quite different genitalia. The type is *A. speciosa* n. sp.

Astrodiplosis speciosa new species.

The midge described below was reared from an irregular stem gall on an unknown vine collected at Puerto Barrios, Guatemala, March 20, 1913, and forwarded to us through the courtesy of Professor E. Bethel, Denver, Col. The species is easily distinguished by its brilliant orange yellow color and strongly contrasting black markings upon both the wings and legs.

Gall.—Length 2 to 9 cm., diameter approximately 2 cm. This is an irregular, gouty stem swelling composed of tumid soft tissues containing here and there irregularly oval cells with a diameter of approximately 2 mm.

Larva.—Length 3.5 mm., moderately stout, tapering slightly at both extremities, yellowish white and with abundant white adipose tissue. Head small, broad, the sides, the indistinct tips of the mouthparts and apparently the labial margins being chitinized. Antennæ stout, uniarticulate, with a length ½ greater than the diameter. Skin coarsely shagreened; breastbone small, bidentate, posteriorly either weakly chitinized or transparent, and a little behind it two indistinct, slightly diverging, black lines. The posterior body segment is stout, much constricted and with a length approximately ½ greater than its diameter.

Exuviæ.—Length 4 mm., light yellowish brown, the antennal cases hardly extending to the base of the abdomen and with cephalic processes at the anterior basal angles, the thoracic processes represented by conical, denticulate elevations. Wing cases reaching to the base of the third abdominal segment; leg cases to the base of the fifth. Abdominal segments dorsally, each with a transverse basal row of irregular, stout, somewhat halbert-shaped spines; terminal segment irregular.

Male.—Length 3.5 mm. Antennæ ½ longer than the body, sparsely haired, yellowish transparent or reddish; 14 segments, the fifth binodose, the stems with a length 2½ and 3½ times their diameters, respectively, the basal enlargement subglobose and with well-developed circumfili extending almost to the base of the cylindric distal enlargement, which latter has a length twice its diameter and well-developed circumfili basally and apically, the loops of the latter extending almost to the apex of the segment. Palpi: the one segment has a length 2½ times its diameter and tapers irregularly from a somewhat swollen base. Eyes broadly confluent; the entire body a deep yellowish orange or reddish orange. Wings fuscous, except most of the area lying between the third and fifth veins and extending from the basal fourth

to the apical fifth and irregularly oval spots between the fifth vein and the posterior margin, one on each side of the branch, these being yellowish. Halteres yellowish. Legs mostly a brilliant orange yellow, the femora and tibiæ black-banded apically; claws long, stout, curved at the distal fourth, simple, the pulvilli rudimentary. Genitalia: basal clasp segment moderately long, stout; terminal clasp segment long, stout, smooth, except for a swollen setose area at the external angles on the basal fourth; dorsal and ventral plates apparently missing. Harpes fused to form a chitinized, spinose tube surrounding the style.

Female.—Length 4 mm. Antennæ extending to the third abdominal segment, sparsely haired, pale yellowish or yellowish orange, distally red; 14 segments, the fifth with a stem ¼ the length of the cylindric basal enlargement, which latter has a length three times its diameter, bears low circumfili near the basal fourth and apically, and a scattering, broad whorl of moderately long setæ near the distal third; terminal segment slightly reduced, with a length three times its diameter and apically a stout, tapering process about half the length of the basal enlargement. Ovipositor short, tapering, the terminal lobes narrowly lanceolate, with a length three times the width and sparsely setose. Other characters practically as in the male. Type Cecid *a*2386.

A SYNOPSIS OF THE DIPTEROUS GROUPS AGROMYZINÆ, MILICHIINÆ, OCHTHIPHILINÆ AND GEOMYZINÆ.[1]

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There need be no apology offered for the issuance of the following paper. Our species have been neglected; many of the commonest forms remain unidentified; there is no adequate tabulation of the species or even of the genera, and the determination, therefore, of a species necessitates laborious searching among scattered descriptions; furthermore, a surprising number of European species occur also in America. Although based almost entirely on my own collection, and therefore necessarily far from a complete treatment, this contribution brings to light so many species new to America as to justify its ap-

[1] Contribution from the Zoölogical Laboratory of the State College of Washington.